

The Development of High Chemical Strength Metallic Glazes

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Special printing materials, granules and specific glazes are used widely on imprinted ceramic tiles and glazes with recent developments. Metallic glazes shows various visual properties like color, texture and brightness depending on composition of the application structure, application method, furnace regime and the oxide ratio of the glaze mixture. High refractive index crystalline structure should be developed to have a metallic effect in the microstructure of the glaze. Particle formation, crystal formation and expanding mechanisms are very important in this process. Therefore metallic glazes forms in the vitreous phase with ordered distribution of crystals having high reflection value. For this reason crystals shine on direct sun light. Shining effect can change with the angle of light directed to the crystals.

In this study, alternative frit mixtures were developed by using iron oxide, copper oxide and lead oxide with the reference of glaze color and surface of Italian and Spanish glaze manufacturers. Large scale frit casting was made from a chosen frit mixture recipe and metallic effect glaze development studies were done. Developed glaze recipes fast kilned under the factory conditions and the results were examined. Phase analysis of the glazes was performed with XRD, color variation with spectrophotometer, L*a*b* variation with gloss tests, metallic crystal effect with SEM. Chemical strength tests and glaze tests were performed according to factory standards. Finally, cost analysis of the successful metallic glaze on the test and compared with the reference metallic glaze recipe.

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